

WHAT IS CLAIMED IS:

1 1. A monitoring device operating on a fiber optic
2 network, the monitoring device comprising:

3 an input port for receiving a wavelength division
4 multiplexed optical signal including a plurality of
5 optical signals centered at different wavelengths within
6 a range of wavelengths;

7 a dispersion device disposed to disperse the
8 wavelength division multiplexed optical signal into a
9 discrete power spectrum;

10 a pixelated optical detector having a point
11 spread function and optically coupled to receive and
12 convert the discrete power spectrum into electrical
13 signals; and

14 at least one computing device receiving digital
15 data representative of the electrical signals, performing
16 a deconvolution operation on the digital data to
17 compensate for the point spread function of the pixelated
18 detector, and generating compensated output data
19 representative of the optical signals.

1 2. The monitoring device according to claim 1,
2 wherein said at least one computing device further
3 transforms the digital data to the frequency domain.

1 3. The monitoring device according to claim 2,
2 wherein the transformation includes performing a fast
3 Fourier transform (FFT).

1 4. The monitoring device according to claim 2,
2 wherein said at least one computing device utilizes a
3 filter representative of the point spread function of said
4 pixelated optical detector.

1 5. The monitoring device according to claim 4,
2 wherein the filter is utilized during the deconvolution
3 operation.

1 6. The monitoring device according to claim 1,
2 wherein said at least one computing device further

3 transforms the compensated output domain to the spatial
4 domain.

1 7. The monitoring device according to claim 1,
2 further comprising at least one of the following:

3 a display coupled to said at least one computing
4 device for displaying the compensated output data,

5 a communication device coupled to said at least
6 one computing device for transmitting the compensated
7 output data.

1 8. The monitoring device according to claim 1,
2 wherein the wavelength range of the wavelength divisional
3 multiple optical signal includes at least one of the
4 following:

5 the optical L-band,
6 the optical C-band, and
7 the optical S-band.

1 9. A method for improving a signal-to-noise ratio
2 measurement range of a monitoring device operating on a
3 fiber optic network, the method comprising:

4 receiving a wavelength division multiplexed
5 optical signal including a plurality of optical signals
6 centered at different wavelengths within a range of
7 wavelengths;

8 dispersing the wavelength division multiplexed
9 optical signal into a discrete power spectrum;

10 measuring the discrete power spectrum by a
11 pixelated optical detector, the measured optical signals
12 including a point spread function response of the
13 pixelated optical detector;

14 generating data representing the measured optical
15 signals;

16 performing a deconvolution operation on the
17 generated data to compensate for the point spread function
18 of the pixelated optical detector; and

19 generating compensated output data representative
20 of the optical signals.

1 10. The method according to claim 9, further
2 comprising:

3 transforming the generated data to the frequency
4 domain prior to performing the deconvolution operation.

1 11. The method according to claim 10, wherein said
2 transforming includes performing a fast Fourier transform
3 (FFT) on the generated data.

1 12. The method according to claim 9, further
2 comprising:

3 measuring a known calibration optical signal by
4 the pixelated optical detector; and

5 generating a filter based upon the measured known
6 calibration optical signal, wherein performing the
7 deconvolution operation utilizes the filter to compensate
8 for the point spread function of the pixelated optical
9 detector.

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1 13. The method according to claim 12, wherein the
2 known calibration optical signal has a substantially
3 Gaussian beam profile.

1 14. The method according to claim 12, wherein the
2 filter is utilized during the deconvolution operation in
3 the frequency domain.

1 15. The method according to claim 9, further
2 comprising:

3 determining a current operating temperature of
4 the pixelated optical detector; and

5 loading a filter generated at an operating
6 temperature closest to the current operating temperature.

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1 16. The method according to claim 9, wherein the
2 deconvolution operation further includes filtering the
3 generated data to compute the compensated output data in
4 the frequency domain.

1 17. The method according to claim 16, further
2 comprising transforming the compensated output data to the
3 spatial domain.

1 18. The method according to claim 17, wherein the
2 transforming includes performing an inverse fast Fourier
3 transform (IFFT).

1 19. The method according to claim 9, further
2 comprising displaying the compensated output data
3 representative of the discrete power spectrum.

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1 20. The method according to claim 9, wherein the
2 wavelength range includes at least one of the following:
3 the optical L-band,
4 the optical C-band, and
5 the optical S-band.

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1 21. A method for calibrating an optical performance
2 monitor having a pixelated optical detector for improving
3 an optical signal-to-noise ratio measurement range of the
4 optical performance monitor, the method comprising:

5 measuring a known calibration optical signal
6 applied to the pixelated optical detector;

7 generating data representative of the measured
8 known calibration optical signal;

9 transforming the generated data into the
10 frequency domain;

11 loading data representative of expected data of
12 the known calibration optical signal in the frequency
13 domain; and

14 generating a filter in the frequency domain based
15 on the generated and expected data, the filter being
16 utilized to improve the signal-to-noise ratio measurement
17 range of the optical performance monitor.

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1 22. The method according to claim 21, further
2 comprising storing the filter.

1 23. The method according to claim 21, wherein the
2 known calibration optical signal has a substantially
3 Gaussian beam profile.

1 24. The method according to claim 21, wherein the
2 known calibration optical signal is a plurality of
3 calibration optical signals, each calibration optical
4 signal being measured simultaneously.

1 25. The method according to claim 21, further
2 comprising:

3 adjusting an operating temperature of the
4 pixelated optical detector of the optical performance
5 monitor prior to measuring the known optical signal; and

6 storing the generated filter using the generated
7 data at the adjusted operating temperature.

1 26. A computer-readable medium having stored thereon
2 sequences of instructions, the sequences of instructions
3 including instructions, when executed by a processor of an
4 optical performance monitor, causes the processor to:

5 load filter data representative of differences
6 between a known calibration optical signal and an expected
7 measurement of the known calibration optical signal;

8 receive measured data representative of at least
9 one optical signal from a pixelated optical detector;

10 deconvolve the measured data utilizing the loaded
11 filter data to produce corrected data; and

12 output the corrected data.

1 27. The computer-readable medium according to claim
2 26, wherein the known calibration optical signal has a
3 substantially Gaussian beam profile.

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General information		Study, No.	
Study	Year	1	2
1. Study design			
a. Cohort		1	1
b. Case-control		1	1
c. Cross-sectional		1	1
d. Other		1	1
2. Population			
a. General population		1	1
b. Occupational		1	1
c. Institutional		1	1
d. Other		1	1
3. Exposure			
a. Occupational		1	1
b. Environmental		1	1
c. Lifestyle		1	1
d. Other		1	1
4. Outcome			
a. Mortality		1	1
b. Morbidity		1	1
c. Quality of life		1	1
d. Other		1	1
5. Results			
a. Relative risk		1	1
b. Odds ratio		1	1
c. Hazard ratio		1	1
d. Other		1	1
6. Conclusions			
a. Strong		1	1
b. Weak		1	1
c. Inconclusive		1	1
d. Other		1	1

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